

Hudson Slay-Site Visit Notes
Lahaina Wastewater Reclamation Facility Tracer Test #2
August 11, 2011

The purpose of my visit to Maui on August 11, 2011, was to witness and document the second introduced dye tracer test using sulpha Rhodamine B (SRB) at the Lahaina Wastewater Reclamation Facility (LWRF) (photo 1). The introduced dye tracer test was being performed by researchers from the University of Hawaii Department of Geology and Geophysics with assistance from the Hawaii Department of Health. I arrived at the Kapalua airport on the Island of Maui at approximately 1015 (after a mechanical flight delay) and traveled to the Kahekili Beach Park. Meghan Dailer and her student assistant had just completed their morning seep sampling. I talked to them and photographed some of their sampling equipment.

At approximately 1115, I walked north along Kaanapali Beach with Meghan Dailer and entered the water just north of the Marriot adjacent to the beach park and just to the south of the limestone outcroppings on the beachface (photo 2 and 3). While snorkeling approximately 30-50 feet off the beach at a depth of approximately eight to ten feet, I viewed the three north seeps outfitted with piezometers and sampling port 'pigtails' (photos 4-6). We snorkeled the shoreline from the north seeps where we observed what appeared to be anoxic staining on bottom rubble (photo 7). We continued along the shoreline toward the south seeps and then beyond the immediate shoreline area to the main reef. After exiting the water, I departed Kahekili Beach Park at approximately 1220 with plans to return and meet Meghan Dailer and her sampling assistants between 1530 and 1600.

I arrived at the Lahaina Wastewater Reclamation Facility at approximately 1300. Upon arrival, I introduced myself to two Maui County Wastewater Department employees (Deborah and Virgil). Craig Glenn, Bob Whittier (University of Hawaii-UH), Dan Chang (Hawaii DOH), Joe (UH graduate student), and Christine (UH graduate student) were also present with all but Craig Glenn working the dye addition (photo 8-10). According to Bob Whittier, flow to wells #3 and #4 had to be decreased to increase the flow to well #2. I checked the flow at each well flow gage and they were as follows:

WELL	TIME	FLOW (Gallons per minute)
1	1509	0
2	1508	~1500
3	1502	~1000
4	1503	~16

After observing more dye addition, I departed the LWRF at approximately 1545 and headed toward Kaanapali Beach to meet Meghan Dailer and her assistants.

I arrived at the beach at approximately 1600 and observed the sampling procedures at the north seeps. The sampling procedure involves a snorkeler locating the piezometer sample tubing port 'pigtail' and connecting the Teflon sample tubing. This tubing runs from the underwater piezometer up the beach and is connected to a peristaltic pump (photo 11-12). The pump is used to fill a container (after an initial purge of tubing) where a datasonde is used to collect temperature and salinity data. A subsequent sample is taken to fill the opaque bottles which are later analyzed offsite using a portable fluorometer intended to detect the fluorescent dye (photo 13).

Other Observations

Meghan Dailer had indicated earlier in the day that the seep water temperature sampled by pumping had dropped significantly (~5 degrees C) during one of the late night sampling events. It was unclear to me if this had been occurring consistently or it was a single occurrence. The UH crew was not certain about what might be causing this and determined the best approach was to deploy HOBOT temperature/salinity data loggers to confirm the seep temperature more directly over a longer period of time. The first data loggers were scheduled for deployment on August 12, 2011.

I departed Kaanapali Beach for the airport at approximately 1615 for my return to Honolulu.



Photo 1. Aerial view LWRF



Photo 2. View from Kaanapali Beach NE to LWRF



Photo 3. Limestone outcrop @ Kaanapali Beach just north of northern seeps



Photo 4. Northern seeps with piezometers and sampling port 'pigtails'



Photo 5. North seep with freshwater flow



Photo 6. Closeup of piezometer sampling port pigtail



Photo 7. Anoxic staining of bottom rubble near north seeps



Photo 8. LWRP dye injection

Time				Depth			
Time	Actual	Target	Time	Actual	Target	Time	Actual
7:30	8.0	8.0	17:30	18.0	18.0		
7:45	8.5	8.5	17:45	18.5	18.5		
8:00	9.0	9.0	18:00	19.0	19.0		
8:15	9.5	9.5	18:15	19.5	19.5		
8:30	10.0	10.0	18:30	20.0	20.0		
8:45	10.5	10.5	18:45	20.5	20.5		
9:00	11.0	11.0	19:00	21.0	21.0		
9:15	11.5	11.5	19:15	21.5	21.5		
9:30	12.0	12.0	19:30	22.0	22.0		
9:45	12.5	12.5	19:45	22.5	22.5		
10:00	13.0	13.0	20:00	23.0	23.0		
10:15	13.5	13.5	20:15	23.5	23.5		
10:30	14.0	14.0	20:30	24.0	24.0		
10:45	14.5	14.5	20:45	24.5	24.5		
11:00	15.0	15.0	21:00	25.0	25.0		
11:15	15.5	15.5	21:15	25.5	25.5		
11:30	16.0	16.0	21:30	26.0	26.0		
11:45	16.5	16.5	21:45	26.5	26.5		
12:00	17.0	17.0	22:00	27.0	27.0		
12:15	17.5	17.5	22:15	27.5	27.5		
12:30	18.0	18.0	22:30	28.0	28.0		
12:45	18.5	18.5	22:45	28.5	28.5		
13:00	19.0	19.0	23:00	29.0	29.0		
13:15	19.5	19.5	23:15	29.5	29.5		
13:30	20.0	20.0	23:30	30.0	30.0		
13:45	20.5	20.5	23:45	30.5	30.5		
14:00	21.0	21.0	24:00	31.0	31.0		
14:15	21.5	21.5	24:15	31.5	31.5		
14:30	22.0	22.0	24:30	32.0	32.0		
14:45	22.5	22.5	24:45	32.5	32.5		
15:00	23.0	23.0	25:00	33.0	33.0		
15:15	23.5	23.5	25:15	33.5	33.5		
15:30	24.0	24.0	25:30	34.0	34.0		
15:45	24.5	24.5	25:45	34.5	34.5		
16:00	25.0	25.0	26:00	35.0	35.0		
16:15	25.5	25.5	26:15	35.5	35.5		
16:30	26.0	26.0	26:30	36.0	36.0		
16:45	26.5	26.5	26:45	36.5	36.5		
17:00	27.0	27.0	27:00	37.0	37.0		
17:15	27.5	27.5	27:15	37.5	37.5		
17:30	28.0	28.0	27:30	38.0	38.0		
17:45	28.5	28.5	27:45	38.5	38.5		
18:00	29.0	29.0	28:00	39.0	39.0		
18:15	29.5	29.5	28:15	39.5	39.5		
18:30	30.0	30.0	28:30	40.0	40.0		
18:45	30.5	30.5	28:45	40.5	40.5		
19:00	31.0	31.0	29:00	41.0	41.0		
19:15	31.5	31.5	29:15	41.5	41.5		
19:30	32.0	32.0	29:30	42.0	42.0		
19:45	32.5	32.5	29:45	42.5	42.5		
20:00	33.0	33.0	30:00	43.0	43.0		
20:15	33.5	33.5	30:15	43.5	43.5		
20:30	34.0	34.0	30:30	44.0	44.0		
20:45	34.5	34.5	30:45	44.5	44.5		
21:00	35.0	35.0	31:00	45.0	45.0		
21:15	35.5	35.5	31:15	45.5	45.5		
21:30	36.0	36.0	31:30	46.0	46.0		
21:45	36.5	36.5	31:45	46.5	46.5		
22:00	37.0	37.0	32:00	47.0	47.0		
22:15	37.5	37.5	32:15	47.5	47.5		
22:30	38.0	38.0	32:30	48.0	48.0		
22:45	38.5	38.5	32:45	48.5	48.5		
23:00	39.0	39.0	33:00	49.0	49.0		
23:15	39.5	39.5	33:15	49.5	49.5		
23:30	40.0	40.0	33:30	50.0	50.0		
23:45	40.5	40.5	33:45	50.5	50.5		
24:00	41.0	41.0	34:00	51.0	51.0		
24:15	41.5	41.5	34:15	51.5	51.5		
24:30	42.0	42.0	34:30	52.0	52.0		
24:45	42.5	42.5	34:45	52.5	52.5		
25:00	43.0	43.0	35:00	53.0	53.0		
25:15	43.5	43.5	35:15	53.5	53.5		
25:30	44.0	44.0	35:30	54.0	54.0		
25:45	44.5	44.5	35:45	54.5	54.5		
26:00	45.0	45.0	36:00	55.0	55.0		
26:15	45.5	45.5	36:15	55.5	55.5		
26:30	46.0	46.0	36:30	56.0	56.0		
26:45	46.5	46.5	36:45	56.5	56.5		
27:00	47.0	47.0	37:00	57.0	57.0		
27:15	47.5	47.5	37:15	57.5	57.5		
27:30	48.0	48.0	37:30	58.0	58.0		
27:45	48.5	48.5	37:45	58.5	58.5		
28:00	49.0	49.0	38:00	59.0	59.0		
28:15	49.5	49.5	38:15	59.5	59.5		
28:30	50.0	50.0	38:30	60.0	60.0		
28:45	50.5	50.5	38:45	60.5	60.5		
29:00	51.0	51.0	39:00	61.0	61.0		
29:15	51.5	51.5	39:15	61.5	61.5		
29:30	52.0	52.0	39:30	62.0	62.0		
29:45	52.5	52.5	39:45	62.5	62.5		
30:00	53.0	53.0	40:00	63.0	63.0		
30:15	53.5	53.5	40:15	63.5	63.5		
30:30	54.0	54.0	40:30	64.0	64.0		
30:45	54.5	54.5	40:45	64.5	64.5		
31:00	55.0	55.0	41:00	65.0	65.0		
31:15	55.5	55.5	41:15	65.5	65.5		
31:30	56.0	56.0	41:30	66.0	66.0		
31:45	56.5	56.5	41:45	66.5	66.5		
32:00	57.0	57.0	42:00	67.0	67.0		
32:15	57.5	57.5	42:15	67.5	67.5		
32:30	58.0	58.0	42:30	68.0	68.0		
32:45	58.5	58.5	42:45	68.5	68.5		
33:00	59.0	59.0	43:00	69.0	69.0		
33:15	59.5	59.5	43:15	69.5	69.5		
33:30	60.0	60.0	43:30	70.0	70.0		
33:45	60.5	60.5	43:45	70.5	70.5		
34:00	61.0	61.0	44:00	71.0	71.0		
34:15	61.5	61.5	44:15	71.5	71.5		
34:30	62.0	62.0	44:30	72.0	72.0		
34:45	62.5	62.5	44:45	72.5	72.5		
35:00	63.0	63.0	45:00	73.0	73.0		
35:15	63.5	63.5	45:15	73.5	73.5		
35:30	64.0	64.0	45:30	74.0	74.0		
35:45	64.5	64.5	45:45	74.5	74.5		
36:00	65.0	65.0	46:00	75.0	75.0		
36:15	65.5	65.5	46:15	75.5	75.5		
36:30	66.0	66.0	46:30	76.0	76.0		
36:45	66.5	66.5	46:45	76.5	76.5		
37:00	67.0	67.0	47:00	77.0	77.0		
37:15	67.5	67.5	47:15	77.5	77.5		
37:30	68.0	68.0	47:30	78.0	78.0		
37:45	68.5	68.5	47:45	78.5	78.5		
38:00	69.0	69.0	48:00	79.0	79.0		
38:15	69.5	69.5	48:15	79.5	79.5		
38:30	70.0	70.0	48:30	80.0	80.0		
38:45	70.5	70.5	48:45	80.5	80.5		
39:00	71.0	71.0	49:00	81.0	81.0		
39:15	71.5	71.5	49:15	81.5	81.5		
39:30	72.0	72.0	49:30	82.0	82.0		
39:45	72.5	72.5	49:45	82.5	82.5		
40:00	73.0	73.0	50:00	83.0	83.0		
40:15	73.5	73.5	50:15	83.5	83.5		
40:30	74.0	74.0	50:30	84.0	84.0		
40:45	74.5	74.5	50:45	84.5	84.5		
41:00	75.0	75.0	51:00	85.0	85.0		
41:15	75.5	75.5	51:15	85.5	85.5		
41:30	76.0	76.0	51:30	86.0	86.0		
41:45	76.5	76.5	51:45	86.5	86.5		
42:00	77.0	77.0	52:00	87.0	87.0		
42:15	77.5	77.5	52:15	87.5	87.5		
42:30	78.0	78.0	52:30	88.0	88.0		
42:45	78.5	78.5	52:45	88.5	88.5		
43:00	79.0	79.0	53:00	89.0	89.0		
43:15	79.5	79.5	53:15	89.5	89.5		
43:30	80.0	80.0	53:30	90.0	90.0		
43:45	80.5	80.5	53:45	90.5	90.5		
44:00	81.0	81.0	54:00	91.0	91.0		
44:15	81.5	81.5	54:15	91.5	91.5		
44:30	82.0	82.0	54:30	92.0	92.0		
44:45	82.5	82.5	54:45	92.5	92.5		
45:00	83.0	83.0	55:00	93.0	93.0		
45:15	83.5	83.5	55:15	93.5	93.5		
45:30	84.0	84.0	55:30	94.0	94.0		
45:45	84.5	84.5	55:45	94.5	94.5		
46:00	85.0	85.0	56:00	95.0	95.0		
46:15	85.5	85.5	56:15	95.5	95.5		
46:30	86.0	86.0	56:30	96.0	96.0		
46:45	86.5	86.5	56:45	96.5	96.5		
47:00	87.0	87.0	57:00	97.0	97.0		
47:15	87.5	87.5	57:15	97.5	97.5		
47:30	88.0	88.0	57:30	98.0	98.0		
47:45	88.5	88.5	57:45	98.5	98.5		
48:00	89.0	89.0	58:00	99.0	99.0		
48:15	89.5	89.5	58:15	99.5	99.5		
48:30	90.0	90.0	58:30	100.0	100.0		
48:45	90.5	90.5	58:45	100.5	100.5		
49:00	91.0	91.0	59:00	101.0	101.0		
49:15	91.5	91.5	59:15	101.5	101.5		
49:30	92.0	92.0	59:30	102.0	102.0		
49:45	92.5	92.5	59:45	102.5	102.5		
50:00	93.0	93.0	60:00	103.0	103.0		
50:15	93.5	93.5	60:15	103.5	103.5		
50:30	94.0	94.0	60:30	104.0	104.0		
50:45	94.5	94.5	60:45	104.5	104.5		
51:00	95.0	95.0	61:00	105.0	105.0		
51:15	95.5	95.5	61:15	105.5	105.5		
51:30	96.0	96.0	61:30	106.0	106.0		
51:45	96.5	96.5	61:45	106.5	106.5		
52:00	97.0	97.0	62:00	107.0	107.0		
52:15	97.5	97.5	62:15	107.5	107.5		
52:30	98.0	98.0	62:30	108.0	108.0		
52:45	98.5	98.5	62:45	108.5	108.5		
53:00	99.0	99.0	63:00	109.0	109.0		
53:15	99.5	99.5	63:15	109.5	109.5		
53:30	100.0	100.0	63:30	110.0	110.0		
53:45	100.5	100.5	63:45	110.5	110.5		
54:00	101.0	101.0	64:00	111.0	111.0		
54:15	101.5	101.5	64:15	111.5	111.5		
54:30	102.0	102.0	64:30	112.0	112.0		
54:45	102.5	102.5	64:45	112.5	112.5		
55:00	103.0	103.0	65:00	113.0	113.0		
55:15	103.5	103.5	65:15	113.5	113.5		
55:30	104.0	104.0	65:30	114.0	114.0		
55:45	104.5	104.5	65:45	114.5	114.5		
56:00	105.0	105.0	66:00	115.0	115.0		
56:15	105.5	105.5	66:15	115.5	115.5		
56:30	106.0	106.0	66:30	116.0	116.0		
56:45	106.5	106.5	66:45	116.5	116.5		
57:00	107.0	107.0	67:00				



Photo 11. 8/11/2011 afternoon seep sampling (note tubing on beach)

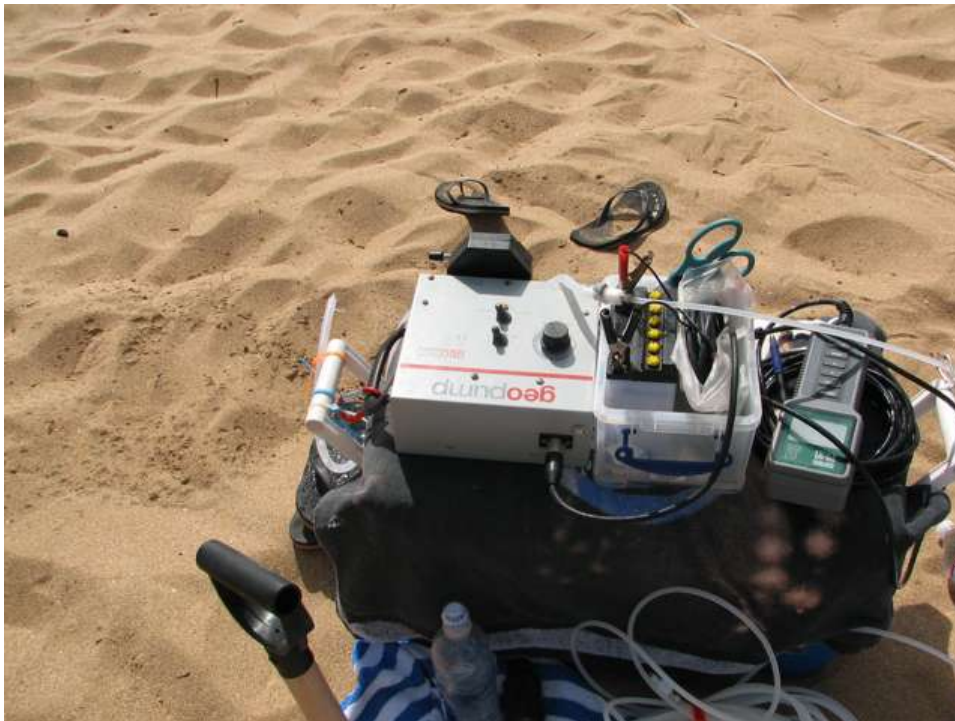


Photo 12. Seep sampling pump and other equipment



Photo 13. Seep sample